

# Claims

- [c1] What is claimed is:
- 1.A semiconductor pressure sensor comprising:  
a non-single-crystal-silicon-based substrate;  
a movable insulating diaphragm;  
at least one piezoresistor positioned on the insulating diaphragm;  
an insulating supporter positioned on the non-single-crystal-silicon-based substrate for fixing two ends of the insulating diaphragm and forming a cavity between the insulating diaphragm and the non-single-crystal-silicon-based substrate; and  
a thin film transistor (TFT) control circuit positioned on the non-single-crystal-silicon-based substrate and electrically connected to the insulating diaphragm and the piezoresistor.
  - [c2] 2.The semiconductor pressure sensor of claim 1 wherein the non-single-crystal-silicon-based substrate is a glass substrate.
  - [c3] 3.The semiconductor pressure sensor of claim 2 wherein the TFT control circuit is a low temperature polysilicon TFT control circuit.

- [c4] 4.The semiconductor pressure sensor of claim 1 wherein the non-single-crystal-silicon-based substrate is a quartz substrate.
- [c5] 5.The semiconductor pressure sensor of claim 4 wherein the TFT control circuit is a high temperature polysilicon TFT control circuit.
- [c6] 6.The semiconductor pressure sensor of claim 1 wherein the insulating diaphragm and the insulating supporter are formed simultaneously.
- [c7] 7.The semiconductor pressure sensor of claim 6 wherein the insulating diaphragm and the insulating supporter both comprise silicon dioxide.
- [c8] 8.The semiconductor pressure sensor of claim 1 wherein the piezoresistor comprises doped polysilicon.
- [c9] 9.The semiconductor pressure sensor of claim 1 wherein the piezoresistor comprises a piezoelectric thin film.
- [c10] 10.The semiconductor pressure sensor of claim 9 wherein the piezoelectric thin film comprises ZnO, Ba-TiO<sub>3</sub>, or PbZrTiO<sub>3</sub> (PZT).
- [c11] 11.The semiconductor pressure sensor of claim 1 wherein the non-single-crystal-silicon-based substrate

further comprises a thin film transistor display region for displaying a variation of pressure detected by the semiconductor pressure sensor.

- [c12] 12.A semiconductor pressure sensor comprising:
  - an insulating substrate;
  - a movable insulating diaphragm;
  - a piezoresistor positioned on the insulating diaphragm;
  - an insulating supporter positioned on the insulating substrate for fixing two ends of the insulating diaphragm and forming a cavity between the insulating diaphragm and the insulating substrate; and
  - a control circuit electrically connected to the insulating diaphragm and the piezoresistor.
- [c13] 13.The semiconductor pressure sensor of claim 12wherein the insulating diaphragm and the insulating supporter are formed simultaneously.
- [c14] 14.The semiconductor pressure sensor of claim 12wherein the insulating diaphragm and the insulating supporter both comprise silicon dioxide.
- [c15] 15.The semiconductor pressure sensor of claim 12wherein the piezoresistor comprises doped polysilicon.
- [c16] 16.The semiconductor pressure sensor of claim

12wherein the piezoresistor is a piezoelectric thin film.

- [c17] 17.The semiconductor pressure sensor of claim 16wherein the piezoelectric thin film comprises ZnO, Ba-TiO<sub>3</sub>, or PbZrTiO<sub>3</sub> (PZT).
- [c18] 18.The semiconductor pressure sensor of claim 12wherein the insulating substrate is a glass substrate.
- [c19] 19.The semiconductor pressure sensor of claim 18wherein the control circuit is positioned on the glass substrate and the control circuit comprises a low temperature polysilicon thin film transistor control circuit.
- [c20] 20.The semiconductor pressure sensor of claim 12wherein the insulating substrate is a quartz substrate.
- [c21] 21.The semiconductor pressure sensor of claim 20wherein the control circuit is positioned on the quartz substrate and the control circuit comprises a high temperature polysilicon thin film transistor control circuit.
- [c22] 22.The semiconductor pressure sensor of claim 12wherein the control circuit is positioned on a printed circuit board (PCB) electrically connected to the insulating diaphragm and the piezoresistor via a flexible printed circuit (FPC) board.
- [c23] 23.The semiconductor pressure sensor of claim

12wherein the control circuit is positioned on a flexible printed circuit (FPC) board, the control circuit being electrically connected to the insulating diaphragm and the piezoresistor via the flexible printed circuit board.

[c24] 24.The semiconductor pressure sensor of claim 12wherein the insulating substrate further comprises a thin film transistor display region for displaying a variation of pressure detected by the semiconductor pressure sensor.